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CIVIL AIR PATROL

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DUTIES OF SERVICEMEN

1. General

The purpose of this course of instruction is to give servicemen an outline of their duties and some practical suggestions regarding their work.

2. Text

The text to be used in this course is presented in the following pages.

3. Distribution

This directive will be distributed on the basis of four copies per Headquarters.

4. Requirement

All personnel assigned to servicing of aircraft are required to take this course, unless already qualified for such work by previous training and experience.

5. Instruction Procedure

In addition to required individual study of the text, there will be at least five instruction periods of one hour each, devoted to discussion, explanation, and practical demonstration. Emphasis will be placed on practical demonstrations.

By direction of National Commander JOHNSON:

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Duties of Servicemen

Section I.

GENERAL

1. Nature of Work

Servicemen, in general, perform such duties as servicing aircraft, assisting in aircraft maintenance, operating and maintaining airport facilities. The proper execution of these duties is an important factor in the safety and efficiency of aircraft operations.

2. Supplementary Instruction

It is suggested that servicemen study texts on theory of flight, maintenance, operation and construction of aircraft, instruments and power plants, etc. Such study will make them of greater value to their organization.

Section II.

SERVICING AIRCRAFT

3. General

Under the heading of servicing aircraft come such operations as refuelling, cleaning, and handling of aircraft, swinging propellers and assisting mechanics. Familiarity with aircraft obtained in this work is a valuable background for future advancement in aviation.

4. Refuelling

Refilling of aircraft gasoline and oil tanks requires certain precautions. They are:

a. When preparing to refuel a plane, be careful to walk, stand and sit in the right place. For instance: Do not stand on wheel pants. Do not sit on the leading edge of the wing. Do not walk all over the wings. (Use walk-ways). Do not lean on the windshield. Airplanes are designed to take such concentrated loads in only a few places. Find out where those places are.

b. Fill gasoline and oil tanks only to their rated capacity, usually shown on the tank cap, and

not completely full. Room must be allowed for expansion. Otherwise, gasoline may overflow and create a fire hazard. Oil may expand and create enough pressure to force off the tank cap.

c. Use the proper grade of fuel. Gasolines are graded by octane number, oils by S.A.E. number. If engines are not supplied with the correct grade of fuel, serious damage is likely to result. Note that oils occasionally are graded by code numbers assigned by the oil company. Frequently such numbers are exactly twice as great as S.A.E. numbers. Find out the proper octane numbers and S.A.E. numbers for engines commonly serviced at the airport.

d. Before starting to fill a gasoline tank, one end of a ground wire should be connected to a part of the plane in metallic contact with its tank. Exhaust pipes are frequently used. The other end of the wire should be permanently attached to the storage tank. By so doing, any static electricity which may have collected on the plane or elsewhere will be discharged harmlessly. Otherwise, when the hose nozzle is put in the tank, the static may discharge in the form of a spark, causing fire.

e. Always make sure tank caps are replaced securely. In the case of gasoline tank caps, also make sure the vent-hole is not clogged and that any tubular vents face in the proper direction. Otherwise, the gasoline may not feed properly.

f. When there is a question as to amount of gasoline in a tank, ALWAYS find out by measuring with a clean stick. DO NOT trust gauges. They are too likely to be wrong.

5. Handling

Handling of aircraft includes moving by hand or by tractor and staking out. Precautions required are:

a. When pushing (or pulling) airplanes, always push on a strong place. Examples are: roots of the struts; fittings where brace wires are attached; the propeller hub; points where two or more struts come together; landing gear tubular members. Do not push on such places as the middle of struts or wires, any trailing edge, propeller blades at any distance from the hub, or unsupported fabric. Do not yank planes around by the rudder or rudder post or wires. Airplanes are not designed to withstand such concentrated loads except at a few places.

b. When moving airplanes close to other airplanes or hangar doors, verify clearance by looking, not guessing.

c. The tail of an airplane should be lifted by the lift handles or at a point on the lower longerons directly below a brace tube or compression member.

d. When towing an airplane by tractor, start and stop smoothly and slowly, not with a jerk. When towing close to another plane, hangar, gasoline pump or other obstruction, either keep a ten-foot clearance or have a person stationed at the obstruction to prevent possible collisions.

e. When airplanes are to be left unattended in the open for a length of time, they should be staked down with control surfaces immobilized and with such covers as are needed.

(1) The general procedure used to stake down an airplane is:

(a) Set brakes and chock the wheels.
(b) Drive a stake into the ground in front and outside of each wing and behind the tail.
(c) Attach a rope from each stake to a strong point on the plane such as junction of wing and strut; tail wheel assembly. On some airplanes special fittings are provided to which the ropes should be fastened. Ropes should not be tied too tight as moisture may cause them to shrink.

(2) To immobilize the control surfaces either use a wooden clamp to hold them in neutral or lash the control stick or wheel and rudder so that they cannot be moved. If a clamp is used, attach rope from the clamp to the door to remind the pilot to remove the clamps before takeoff.

(3) Engine covers serve to keep rain from wetting the magnetos. Windshield covers prevent sunlight from discoloring pyralin.

6. Cleaning

Cleaning of aircraft is necessary for preserving the surface, improving the appearance and as an aid to maintenance. Breaks in ribs, deformations in metal structures, tears in fabric, excess play in fittings or controls are easily found when cleaning the airplane. The following suggestions cover general cleaning work.

a. On fabric surfaces use non-alkaline, non-abrasive cleaners. Do not scrape off dry mud but wash it off.

b. On pyralin windows and windshields use ammonia and water or approved pyralin cleaners. Some glass cleaners will discolor pyralin.

c. On cabin interiors use vacuum cleaners. It is important that loose objects do not fall into the rear of the fuselage where they may jam pulleys. Do not wear greasy clothing when cleaning a cabin.

d. On engines use kerosene, cleaning solvents put out by various oil companies or chemical cleaners designed for removing grease. Do not use gasoline. Besides the extra expense, gasoline may easily be exploded by such means as spark created by friction of a brush on the cylinder. Occasionally fumes flow a considerable distance along the ground and are ignited by a match lit many feet away.

7. Swinging Propellers

a. Swinging propellers to start engines is dangerous to life and limb unless properly done. Servicemen should understand the theory involved and should practice swinging propellers with the switch off until proficient. This practice should take place only under proper supervision.

b. To start an engine by hand, the serviceman will turn the propeller several times with the switch off in order to charge several cylinders with gasoline. Then, with switch on, the serviceman pulls the propeller quickly through one or two compression strokes at which point the engine should start.

c. Before touching the propeller, the serviceman should call "switch off," wait for the pilot to reply "switch off" and then swing the propeller. When ready to start the engine, the serviceman should step back, call "contact," (not "switch on," which is too similar to "switch off"), wait for the pilot to reply "contact" and then start the engine. Never call for "contact" or "switch off" while touching the propeller.

d. To swing the propeller, stand in an erect position a little less than an arms length away, place fingers loosely on the blade and swing it. On some planes, it will help if, at the same time as the arms are swung, the right foot is swung from in front of the left foot to the right and backwards.

e. Some precautions to take before swinging the propeller:

(1) Make sure there is a competent person in the cockpit since an incompetent one is a serious hazard. For instance, he may turn the switch on instead of leaving it off.

(2) Be certain orders for "contact" and "switch off" are complied with. Verbal repetition of the order is customary. If not certain find out. Don't guess.

(3) Watch out for slippery footing such as mud or ice.

(4) Remove or fasten securely loose clothing such as coats or neckties.

(5) Never lean forward. Body weight should be placed

so that the tendency is to fall backward, or sideward, not forward.

(6) If temporarily fatigued because of repeated swinging of the propeller, stop and rest. Tired persons are likely to be careless.

(7) Hold the propeller loosely with fingers. Full lengths of the fingers should never be hooked over the blade.

(8) Always handle the propeller as though the switch were on, even if supposed to be off. Once in awhile, the switch will be on by mistake or perhaps because of a broken ground wire.

8. Assisting Mechanics

In order efficiently to assist certificated mechanics in maintenance of aircraft and engines, servicemen should know:

a. Use of common tools. For example: how much a nut should be tightened; how to use drills; choice of the proper tool for the job, i.e., small screw drivers for small screws, never using pliers to turn or hold a nut, etc.; the function of the various kinds of wrenches.

b. Use of supplies such as safety wire, cotter pins, special fasteners, special screws, dope, etc.

c. Use of equipment such as air compressors, sprayers, battery chargers, etc.

d. The names and functions of various component parts of aircraft such as aileron, longeron, fuel line, switches, valves, etc.

e. How to work on airplanes without injuring themselves or damaging the plane.

f. How to do ordinary jobs such as changing tires, cleaning and adjusting spark-plugs, cleaning strainers, etc.

Section III.

SERVICING OF AIRPORT FACILITIES

9. General

Servicing of airport facilities includes custodial duties

such as cleaning hangars, as well as service duties such as operating and caring for tractors, gasoline pumps, etc.

10. Hangars

Servicemen may be charged with keeping the hangar in orderly condition. This will include disposal of waste in proper receptacles, knowing where to get tools and supplies and replacing them in the proper location, cleaning and sweeping floors, etc. They should be thoroughly familiar with the operation of the hangar doors.

11. Grounds

Maintenance of the grounds will include repair of fences, clearing away rubbish, and similar work.

12. Equipment

Servicemen should know how to operate and care for equipment such as gasoline trucks, pits or pumps, oil pumps, tractors, and other machinery.

13. Fire Protection

It is of primary importance that service personnel be acquainted with methods of preventing and extinguishing fires.

a. Fire prevention in daily work consists of doing it in a safe manner and avoiding unsafe practices. If an unsafe practice is used often enough, a fire will start eventually. The following are examples:

	Safe Practice	Unsafe Practice	Why Unsafe
(1)	Use of guards on extension lights.	Use of extension lights without guards.	Bulb breaks or overheats fabric.
(2)	Cleaning with non-inflammable fluids or chemicals.	Cleaning with gasoline.	A static or friction spark ignites the fumes.
(3)	Refraining from smoking while working on planes.	Smoking in or near planes.	Glowing ashes fall on inflammable material.
(4)	Care in use of heaters.	Using heaters as convenient to dry dope, etc.	The heat created will set the dope on fire.
(5)	Safeguarding welding operations.	Welding where and as convenient.	Welding is the largest single cause of airplane fires.

b. To extinguish fires, all personnel must know where the extinguishers are and how to operate them. In addition, servicemen should know how to maintain extinguishers in proper operating condition which includes refilling them.

14. Care of Landing Areas

Servicemen, at some airports, help in maintaining the landing area. This work includes mowing grass, repairing of soft or rough spots, examining of hard-surfaced runways, taxi strips and aprons for nails or other tire-destroying objects, and snow removal.

15. Care of Airport Lights

Boundary, flood and obstruction lights may be maintained by servicemen. This work includes replacing of bulbs and other maintenance operations.

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